

DOS III BOOTSTRAP LOADER
(REV A)

BINARY TAPE	24307-60005
SOURCE TAPE	24307-80032
SOURCE LISTING	24307-90005

PAGE 0001

0001

ASMB,A,B,L,C

* NO ERRORS*

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0001          ASMB,A,B,L,C
1003*****
0004*
0005* THIS BOOTLOADER IS DESIGNED TO BRING IN A DOS=III
0006* SYSTEM DISC RESIDENT BOOTSTRAP FROM TRACK 0
0007* SECTORS 1&2 OF THE DISC. THE DISC MAY BE ANY
0008* OF THE MOVING HEAD DISCS (ISS,IOMEC,7900/7901)
0009* THE SUBCHANNEL FROM WHICH THE BOOTSTRAP IS TO
0010* BE LOADED IS SPECIFIED IN THE SWITCH REGISTER.
0011* THE BOOTLOADER LOADS THE DISC RESIDENT BOOT-
0012* STRAP INTO CORE STARTING AT LOCATION 15400 &
0013* BEGINS EXECUTION THERE.
0014*
0015* TO CONFIGURE THIS BOOTLOADER:
0016*
0017*     1. LOAD & CONFIGURE A PUNCH SIO DRIVER
0018*
0019*     2. LOAD THE UNCONFIGURED BOOTSTRAP
0020*
0021*     3. SET THE P-REGISTER TO 2
0022*
0023*     4. SET THE S-REGISTER AS FOLLOWS:
0024*         BIT 15 : 1
0025*         BIT 5-0: I/O CHANNEL OF DISC
0026*             (HIGH PRIORITY)
0027*
0028*     5. PRESS RUN.
0029*
0030* TO EXECUTE THE CONFIGURED BOOTLOADER:
0031*
0032*     1. SET THE P-REGISTER TO 100
0033*
0034*     2. SET THE S-REGISTER TO THE SUBCHANNEL
0035*         FROM WHICH THE BOOTSTRAP IS TO BE
0036*         LOADED.
0037*
0038*     3. PRESS RUN
0039*
0040*****
0041*
0042 00002          ORG 2B
0043 00002 024256   JMP CFGG
0044*
0045 00005          ORG 5B
0046 00005 102501   BOOT LIA 1          GET SYSTEM SUBCHNL
0047 00006 010242   AND .7
0048 00007 070501   STA SUBCH         SET SYST SUBCHNL
0049*
0050* SET UP FOR ISS DISC
0051*
0052 00010 010122   AND .3          *
0053 00011 070001   STA B           * COMPUTE
0054 00012 001222   RAL,RAL         *
0055 00013 044000   ADB A          * HEAD=MASK (ISS)
0056 00014 005727   BLF,BLF        *
0057 00015 060501   LDA SUBCH

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0058	00016	001121	ARS,ARS	DRIVE# = SUBCHNL DIV 4 (ISS)
0059	00017	014126	JSB SEEK	ISSUE SEEK
0060*				
0061*	DETERMINE TYPE OF DISC			
0062*				
0063	00020	064226	LDB ISSST	SET ISS
0064	00021	074503	STB STCMD	STATUS COMMAND
0065	00022	060227	LDA ISSRD	GET ISS READ COMMAND
0066	00023	106501	LIB CC	
0067	00024	006003	SZB,RSS	ANY ATTENTION BIT ON?
0068	00025	024041	JMP BOOTX	-NO, GO PROCESS ISS
0069*				
0070*	SET UP FOR IOMEC, 7900/7901 DISC			
0071*				
0072	00026	002400	CLA	SET FOR IOMEC/7900
0073	00027	070503	STA STCMD	STATUS COMMAND
0074	00030	070502	STA DRV#	START CLEAR AT DRIVE 0
0075	00031	014164	JSB CLEAR	MAKE SURE STATUS IS CLEAR
0076	00032	060501	LDA SUBCH	
0077	00033	000065	CLE,ERA	SET DRIVE#
0078	00034	006600	CLB,CME	
0079	00035	005622	ELB,RBL	
0080	00036	005727	BLF,BLF	SET HEAD-MASK
0081	00037	014126	JSB SEEK	ISSUE SEEK
0082	00040	060225	LDA IOMRD	GET IOMEC/7900 READ COMMAND
0083*				
0084*	READ IN DISC RESIDENT BOOTSTRAP			
0085*				
0086	00041	107706	BOOTX CLC 6,C	
0087	00042	064230	LDB DMACH	
0088	00043	106606	OTB 6	OUTPUT DMA CONTROL WORD
0089	00044	064231	LDB MEMAD	
0090	00045	106702	CLC 2	
0091	00046	106602	OTB 2	OUTPUT BUFFER ADDRESS
0092	00047	064245	LDB N256	
0093	00050	102702	STC 2	
0094	00051	106602	OTB 2	OUTPUT WORD COUNT TO WCR
0095	00052	030502	IOR DRV#	INCLUDE DRV# IN READ COMMAND
0096	00053	106701	CLC CC	
0097	00054	102601	OTA CC	OUTPUT READ COMMAND
0098	00055	103700	STC DC,C	SET DATA CHNL FOR READ
0099	00056	103706	STC 6,C	START DMA
0100	00057	103701	STC CC,C	START READ OPERATION
0101	00060	102301	SFS CC	WAIT FOR READ
0102	00061	024060	JMP *-1	TO COMPLETE
0103	00062	102106	STF 6	TURN OFF DMA
0104	00063	014151	JSB STAT	CHECK STATUS
0105	00064	000010	SLA	ERROR?
0106	00065	024075	JMP NRDY	
0107*				
0108*	CHECK FOR VALID DISC RESIDENT BOOTSTRAP			
0109*				
0110	00066	064240	LDB ABEND	GET DISC-RES. BOOT END ADDRESS
0111	00067	144240	ADB ABEND,I	SUBTRACT DISPLACEMENT TO ASPBF
0112	00070	006004	INB	AND INCREMENT TO 1ST ENTRY
0113	00071	160001	LDA B,I	GET 1ST ENTRY OF ASPBF

0114	00072	050241	CPA .2	IS IT A 2 (LOWER CORE BP ADRS.)?
0115	00073	024110	JMP OKSYS	-YES, CONTINUE
0116*				
0117	00074	002400	CLA	-NO
0118	00075	102011	NRDY HLT 11B	
0119	00076	000000	NOP	FILL UP TO 100B
0120	00077	000000	NOP	
0121*				
0122	00100		ORG 100B	BOOTSTRAP START ADDRESS
0123	00100	024005	JMP BOOT	
0124	00105		ORG 105B	
0125	00105	000255	DFEND DEF CHSUM	
0126*				
0127	00110		ORG 110B	
0128*				
0129*	CONFIGURE DISC RESIDENT BOOTSTRAP			
0130*				
0131	00110	044243	OKSYS ADB B17	INCREMENT TO REV. FLAG ADDRESS
0132	00111	160001	LDA B,I	IF = 0, REV B, ELSE REV A
0133	00112	064504	LDB HDMSK	
0134	00113	174233	STB ABHDM,I	SET HEAD# FOR DISC-RES. BOOT
0135	00114	064502	LDB DRV#	
0136	00115	174237	STB ABDRV,I	SET DRIVE# FOR DISC-RES. BOOT
0137	00116	064223	LDB CHAN	
0138	00117	174234	STB ACHNL,I	SAVE DISC I/O CHNL
0139	00120	174235	STB ACCHN,I	
0140	00121	006004	INB	
0141	00122	002003	.3 SZA,RSS	REVISION B IF A=0
0142	00123	064501	LDB SUBCH	
0143	00124	174236	STB ASYSC,I	
0144*				
0145	00125	124232	JMP DBOOT,I	TRANSFER TO DISC-RES. BOOTSTRAP
0146*				
0147	00126	000000	SEEK NOP	
0148	00127	070502	STA DRV#	
0149	00130	074504	STB HDMSK	
0150	00131	006400	CLB	
0151	00132	106600	OTB DC	OUTPUT TRK#
0152	00133	103700	STC DC,C	FOR SEEK
0153	00134	106701	CLC CC	
0154	00135	030224	IOR SKCMD	
0155	00136	102601	OTA CC	OUTPUT SEEK CMND
0156	00137	103701	STC CC,C	TO COMMAND CHNL
0157	00140	102300	SFS DC	
0158	00141	024140	JMP *-1	
0159	00142	060504	LDA HDMSK	
0160	00143	002004	INA	SET FOR SECTOR 1
0161	00144	102600	OTA DC	OUTPUT HEAD/SCTR
0162	00145	103700	STC DC,C	TO DATA CHNL
0163	00146	102301	SFS CC	WAIT FOR SEEK
0164	00147	024146	JMP *-1	TO COMPLETE
0165	00150	124126	JMP SEEK,I	
0166*				
0167	00151	000000	STAT NOP	
0168	00152	103700	STC DC,C	
0169	00153	060502	LDA DRV#	

0170	00154	030503		IOR STCMD	INCLUDE STATUS CMND
0171	00155	106701		CLC CC	
0172	00156	102601		OTA CC	OUTPUT STATUS CMND
0173	00157	103701		STC CC,C	TO COMMAND CHNL
0174	00160	102300		SFS DC	
0175	00161	024160		JMP *-1	
0176	00162	102500		LIA DC	GET STATUS
0177	00163	124151		JMP STAT,I	
0178*					
0179*	ROUTINE TO FIX MULTI-DRIVE 7900 CONTROLLER PROBLEM				
0180*					
0181*	1. ISSUE A STATUS COMMAND TO EACH OF				
0182*	THE FOUR POSSIBLE DRIVES TO CLEAR				
0183*	THE ATTENTION BITS.				
0184*	2. CHECK THE NOT READY STATUS BIT FROM				
0185*	EACH DRIVE. IF THE DRIVE IS READY, ISSUE				
0186*	A SEEK COMMAND TO CLEAR THE SEEK CHECK				
0187*	STATUS FOLLOWED BY A STATUS COMMAND TO				
0188*	CLEAR THE ATTENTION BIT				
0189*					
0190	00164	000000	CLEAR	NOP	
0191	00165	060246		LDA M4	
0192	00166	070247		STA CNT	
0193	00167	014151	CL1	JSB STAT	ISSUE STATUS COMMAND
0194	00170	010244		AND B104	MASK READY(BIT6),BUSY(BIT2) STAT
0195	00171	064250		LDB ADSB	COMPUTE ADDRESS OF
0196	00172	044502		ADB DRV#	DISC STATUS BUFFER
0197	00173	170001		STA B,I	SAVE READY STATUS OF DRIVE
0198	00174	001727		ALF,ALF	IS DRIVE
0199	00175	001222		RAL,RAL	READY
0200	00176	002011		SLA,RSS	(I.E., BIT 6 = 0)?
0201	00177	024220		JMP CL3	YES, CHECK BIT 2.
0202	00200	034502	CL4	ISZ DRV#	NO
0203	00201	034247		ISZ CNT	
0204	00202	024167		JMP CL1	REPEAT FOR 4 DRIVES
0205*					
0206	00203	003400	CL2	CCA	CHECK TO SE IF SEEK COMMAND
0207	00204	040502		ADA DRV#	SHOULD BE ISSUED TO DRIVE
0208	00205	070502		STA DRV#	STARTING AT DRIVE 3
0209	00206	002020		SSA	DONE WITH 4 DRIVES?
0210	00207	124164		JMP CLEAR,I	YES - EXIT
0211	00210	040250		ADA ADSB	WAS THIS
0212	00211	164000		LDB A,I	DRIVE
0213	00212	006002		SZB	READY?
0214	00213	024203		JMP CL2	NO - IGNORE IT
0215	00214	060502		LDA DRV#	YES- ISSUE
0216	00215	014126		JSB SEEK	SEEK COMMAND TO DRIVE
0217	00216	014151		JSB STAT	ISSUE STATUS COMMAND
0218	00217	024203		JMP CL2	CONTINUE
0219*					
0220	00220	001710	CL3	ALF,SLA	IS DRIVE BUSY?
0221	00221	024167		JMP CL1	YES - WAIT TILL NOT BUSY.
0222	00222	024200		JMP CL4	NO - CLEAR NEXT DRIVE.
0223*					
0224	00223	000000	CHAN	NOP	
0225	00224	030000	SKCMD	OCT 030000	

0226	00225	020000	IOMRD	OCT	020000
227	00226	010000	ISSST	OCT	010000
0228	00227	040000	ISSRD	OCT	040000
0229	00230	120000	DMACW	OCT	120000
0230	00231	115400	MEMAD	OCT	115400
0231	00232	015400	DBOOT	OCT	15400
0232	00233	015772	ABHDM	OCT	15772
0233	00234	015773	ACHNL	OCT	15773
0234	00235	015774	ACCHN	OCT	15774
0235	00236	015775	ASYSC	OCT	15775
0236	00237	015776	ABDRY	OCT	15776
0237	00240	015777	ABEND	OCT	15777
0238	00241	000002	.2	OCT	2
0239	00242	000007	.7	OCT	7
0240	00243	000017	B17	OCT	17
0241	00244	000104	B104	OCT	104
0242	00245	177400	N256	DEC	256
0243	00246	177774	M4	DEC	4
0244	00247	000000	CNT	NOP	
0245	00250	000251	ADSB	DEF	++1
0246	00251	000000	BSS	4	
0247*					
0248	00000		A	EQU	0B
0249	00001		B	EQU	1B
0250*					
0251	00000		DC	EQU	0
0252	00001		CC	EQU	1
0253*					
0254	00500		.	EQU	500B
0255	00501		SUBCH	EQU	++1
0256	00502		DRV#	EQU	++2
0257	00503		STCMD	EQU	++3
0258	00504		HDMSK	EQU	++4

MASK FOR BITS 6 AND 2

DISC STATUS BUFFER
READY STATUS FOR 4 DRIVES

DISC DATA CHANNEL
DISC CMND CHANNEL

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0260*
0261 00255 000000 CHSUM NOP
0262*
0263 00256 102501 CONFIG LIA 1          GET DISC DATA CHANNEL
0264 00257 010373      AND B77
0265 00260 070223      STA CHAN
0266 00261 030230      IOR DMACW
0267 00262 070230      STA DMACW      CONFIGURE DMA CNTRL WORD
0268 00263 060105      LDA DFEND
0269 00264 003000      CMA
0270 00265 040365      ADA DEFBT
0271 00266 070366      STA CNTR
0272 00267 064365      LDB DEFBT
0273 00270 006004      CLOOP INB          *
0274 00271 160001      LDA B,I          *
0275 00272 002021      SSA,RSS          * CONFIGURE ALL
0276 00273 024302      JMP CNEXT          *
0277 00274 010374      AND MASK          * DISC I/O
0278 00275 002002      SZA          *
0279 00276 024302      JMP CNEXT          * INSTRUCTIONS
0280 00277 160001      LDA B,I          *
0281 00300 040223      ADA CHAN          * IN BOOTSTRAP
0282 00301 170001      STA B,I          *
0283 00302 034366      CNEXT ISZ CNTR
0284 00303 024270      JMP CLOOP
0285*
0286 00304 102501      LIA 1
0287 00305 002020      SSA
0288 00306 024311      JMP PUNCH      PUNCH CONFIGURED BOOTSTRAP?
0289*
0290 00307 102077      HLT 77B          -YES
0291 00310 024005      JMP BOOT      GO EXECUTE BOOTSTRAP
0292*

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0294	00311	060241	PUNCH	LDA ,2	
295	00312	070364		STA ABSAD	SET BOOTSTRAP START ADDRESS
0296	00313	003004		CMA,INA	
0297	00314	040105		ADA DFEND	
0298	00315	070367		STA TEMP	SAVE BOOTSTRAP END ADDRESS
0299	00316	001727		ALF,ALF	
0300	00317	010245		AND M1774	
0301	00320	070363		STA RCLNG	SET PUNCH RECORD LENGTH
0302*					
0303	00321	002400		CLA	
0304	00322	070002		STA 2B	
0305	00323	070003		STA 3B	
0306	00324	070004		STA 4B	
0307	00325	060367		LDA TEMP	
0308	00326	003004		CMA,INA	
0309	00327	070366		STA CNTR	SET COUNTER FOR CHECKSUM
0310	00330	060364		LDA ABSAD	
0311	00331	064241		LDB ,2	
0312	00332	140001	KLOOP	ADA B,I	*
0313	00333	006004		INB	* GENERATE
0314	00334	034366		ISZ CNTR	* CHECKSUM
0315	00335	024332		JMP KLOOP	* FOR BBL
0316	00336	070255		STA CHSUM	*
0317*					
0318	00337	060370	PMORE	LDA N50	
0319	00340	064375		LDB AFDFR	
0320	00341	114103		JSB HSPDR,I	PUNCH LEADER
0321*					
0322	00342	060371		LDA N2	
0323	00343	064362		LDB SHREC	
0324	00344	114103		JSB HSPDR,I	PUNCH RECORD LENGTH, ABS ADDR
0325*					
0326	00345	060367		LDA TEMP	
0327	00346	003004		CMA,INA	
0328	00347	002004		INA	
0329	00350	064372		LDB ,4	
0330	00351	114103		JSB HSPDR,I	PUNCH BOOTSTRAP
0331*					
0332	00352	060370		LDA N50	
0333	00353	064375		LDB AFDFR	
0334	00354	114103		JSB HSPDR,I	PUNCH TRAILER
0335*					
0336	00355	102077		HLT 77B	
0337	00356	102501		LIA 1	
0338	00357	002020		SSA	PUNCH AGAIN?
0339	00360	024337		JMP PMORE	
0340	00361	024005		JMP BOOT	-NO, GO EXECUTE BOOTSTRAP
0341*					
0342	00362	000363	SHREC	DEF **1	
0343	00363	000000	RCLNG	NOP	
0344	00364	000000	ABSAD	NOP	
0345	00103		HSPDR	EQU 103B	
0346	00365	000005	DEFBT	DEF BOOT	
0347	00366	000000	CNTR	NOP	
0348	00367	000000	TEMP	NOP	
0349	00370	177716	N50	DEC -50	

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0350 00371 177776 N2 DEC =2
0351 00372 000004 .4 OCT 4
0352 00373 000077 B77 OCT 77
0353 00374 070036 MASK OCT 070036
0354 00245 M1774 EQU N256
0355*
0356 00375 000376 AFDPR DEF ++1
0360 LST
0361*
0362 END
** NO ERRORS*
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ORG *** 00042/02 00045/02 00122/02 00124/02 00127/02
. 00254/02 00255/02 00256/02 00257/02 00258/02
.2 00238/02 00114/02 00294/02 00311/02
.3 00141/02 00052/02
.4 00351/02 00329/02
.7 00239/02 00047/02
A 00248/02 00055/02 00212/02
ABDRV 00236/02 00136/02
ABEND 00237/02 00110/02 00111/02
ABHDM 00232/02 00134/02
ABSAD 00344/02 00295/02 00310/02
ACCHN 00234/02 00139/02
ACHNL 00233/02 00138/02
ADSB 00245/02 00195/02 00211/02
AFDFR 00356/02 00319/02 00333/02
ASYSC 00235/02 00143/02
B 00249/02 00053/02 00113/02 00132/02 00197/02 00274/02 00280/02
00282/02 00312/02
B104 00241/02 00194/02
B17 00240/02 00131/02
B77 00352/02 00264/02
BOOT 00046/02 00123/02 00291/02 00340/02 00346/02
BOOTX 00086/02 00068/02
CC 00252/02 00066/02 00096/02 00097/02 00100/02 00101/02 00153/02
00155/02 00156/02 00163/02 00171/02 00172/02 00173/02
CHAN 00224/02 00137/02 00265/02 00281/02
CHSUM 00261/02 00125/02 00316/02
CL1 00193/02 00204/02 00221/02
CL2 00206/02 00214/02 00218/02

CL3	00220/02	00201/02					
CL4	00202/02	00222/02					
CLEAR	00190/02	00075/02	00210/02				
CLOOP	00273/02	00284/02					
CNEXT	00283/02	00276/02	00279/02				
CNT	00244/02	00192/02	00203/02				
CNTR	00347/02	00271/02	00283/02	00309/02	00314/02		
CONFG	00263/02	00043/02					
DBOOT	00231/02	00145/02					
DC	00251/02	00098/02	00151/02	00152/02	00157/02	00161/02	00162/02
	00168/02	00174/02	00176/02				
DEFBT	00346/02	00270/02	00272/02				
DFEND	00125/02	00268/02	00297/02				
DMACH	00229/02	00087/02	00266/02	00267/02			
DRV#	00256/02	00074/02	00095/02	00135/02	00148/02	00169/02	00196/02
	00202/02	00207/02	00208/02	00215/02			
HDMSK	00258/02	00133/02	00149/02	00159/02			
HSPDR	00345/02	00320/02	00324/02	00330/02	00334/02		
IOMRD	00226/02	00082/02					
ISSRD	00228/02	00065/02					
ISSST	00227/02	00063/02					
KLOOP	00312/02	00315/02					
M1774	00354/02	00300/02					
M4	00243/02	00191/02					
MASK	00353/02	00277/02					
MEMAD	00230/02	00089/02					
N2	00350/02	00322/02					
N256	00242/02	00092/02	00354/02				
N50	00349/02	00318/02	00332/02				

NRDY 00118/02 00106/02
OKSYS 00131/02 00115/02
PMORE 00318/02 00339/02
PUNCH 00294/02 00288/02
RCLNG 00343/02 00301/02
SEEK 00147/02 00059/02 00081/02 00165/02 00216/02
SHREC 00342/02 00323/02
SKCMD 00225/02 00154/02
STAT 00167/02 00104/02 00177/02 00193/02 00217/02
STCMD 00257/02 00064/02 00073/02 00170/02
SUBCH 00255/02 00048/02 00057/02 00076/02 00142/02
TEMP 00348/02 00298/02 00307/02 00326/02